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Intellectual Property Law Group

Verizon Corporate Services Group Inc

To: **U.S. Patent and Trademark Office – MAIL STOP: Appeal Brief - PATENTS**
Examiner: Anh LY
Group Art Unit: 2162

From: Christian R. Andersen
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FORMAL SUBMISSION OF:

1) **Transmittal of Appeal Brief; and**
2) **Appeal Brief.**

Title: **SYSTEM AND METHOD FOR AUTOMATIC LOADING OF AN XML DOCUMENT DEFINED BY A DOCUMENT TYPE DEFINITION INTO A RELATIONAL DATABASE INCLUDING THE GENERATION OF A RELATIONAL SCHEMA THEREFOR**
Serial No. **09/783,657**
Filing Date: **February 14, 2001**
First Named Inventor: **Wang-Chien LEE**
Atty. No. **00-8013 RCE 1**

CERTIFICATE OF FACSIMILE TRANSMISSION

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Christian R. Andersen

Date of Transmission: April 25, 2005

#1742 v1

TRANSMITTAL OF APPEAL BRIEF	Docket No. 00-8013/RCE1

In re Application of: Wang-Chien Lee et al.

Application No.	Filing Date	Examiner	Group Art Unit
09/783,657	February 14, 2001	Ly, Anh	2162

Invention: SYSTEM AND METHOD FOR AUTOMATIC LOADING OF AN XML DOCUMENT DEFINED BY A DOCUMENT-TYPE DEFINITION INTO A RELATIONAL DATABASE INCLUDING THE GENERATION OF A RELATIONAL SCHEMA THEREFOR

TO THE COMMISSIONER OF PATENTS:

Transmitted herewith is the Appeal Brief in this application, with respect to the Notice of Appeal filed: February 25, 2005 .

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Dated: April 25, 2005

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Docket No. 00-8013/RCE1

09/783,657

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In the Patent Application of:
Wang-Chien Lee et al.

Application No. 09/783,657

Filed: February 14, 2001

For: SYSTEM AND METHOD FOR AUTOMATIC LOADING OF AN XML DOCUMENT DEFINED BY A DOCUMENT-TYPE DEFINITION INTO A RELATIONAL DATABASE INCLUDING THE GENERATION OF A RELATIONAL SCHEMA THEREFOR

Group Art Unit: 2162

Examiner: Ly, Anh

APPEAL BRIEF

Mail Stop Appeal Brief - Patents
Commissioner for Patents
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Alexandria, VA 22313-1450

Sir:

This is an Appeal Brief under Rule 41.37 appealing the final decision of the Examiner dated October 22, 2004. Each of the topics required by Rule 41.37 is presented herewith and is labeled appropriately.

I. Real Party in Interest

The real party in interest is Verizon Laboratories, Inc., Assignee, a corporation organized and existing under the laws of the state of Delaware, and having a place of business at 40 Sylvan Road, Waltham, MA 02451.

II. Related Appeals and Interferences

There are no appeals or interferences related to the present application of which the Appellants are aware.

III. Status of Claims

Claims 1-69 and 71-74 are currently pending in the application and all stand finally rejected. Claim 70 has been cancelled. Appellants appeal from the final rejection of claims 1-69 and 71-74, which claims are presented in the Claims Appendix.

IV. Status of Amendments

Following the final Office Action of October 22, 2004 (hereinafter "the Office Action"), Appellants filed one after-final response on December 21, 2004. In that response, Appellants sought cancellation of claim 70, as well as entry of amendments to claims 67 and 71 into the record. In the Advisory Action of February 4, 2005, the Examiner entered the proposed amendments to claims 67, 70, and 71 into the record for purposes of appeal. Accordingly, there are no outstanding after-final amendments to the claims, and claims 1-69 and 71-74 stand rejected for purposes of this appeal.

V. Summary of Claimed Subject Matter

Appellants' disclosure provides a system and method for automatically loading an XML document (12) defined by a document-type definition ("DTD") (18) into a relational database (14), including the automatic generation of relational schema (22). An extractor (24) extracts metadata from the DTD (18) associated with the XML document (12) and stores data representative of the DTD (18) in metadata tables (34). The metadata tables (34) include data representative of the elements, attributes, and nesting relationships contained in the DTD (18). The data may be stored in different metadata tables (34), including a metadata item table (90), a metadata attribute table (92), and a metadata nesting table (94). (Figures 1 and 1A; Appellants' specification, page 15, lines 20-23; page 17, lines 22-24; and page 18, lines 12-16).

A generator (28) queries the metadata tables (34) and uses the data stored therein to automatically generate relational schema (22) in the relational database (14). The generation of the relational schema (22) may include creating tables (20) in the relational database (14), adding columns to the tables (20) to correspond with attributes in the metadata tables (34), and determining and adding nesting relationships to the relational schema (22) in accordance with the relationships stored in the metadata tables (34). The tables (20) may be defined in correspondence with content particles (e.g., element items) stored in the metadata tables (34). Mapping rules defining transformations may be applied over the metadata tables (34) to automatically map the DTD (18) to the relational schema (22). (Appellants' specification, page 15, lines 20-23; page 17, lines 25-26; page 20, lines 5-12 and 28-29; and page 31, lines 13-16).

A pattern mapping table (36) is generated from the metadata tables (34) and fed to a loader (30), which uses the pattern-mapping table (36) to load XML document data of the

XML document (12) into the tables (20) of the relational database (14). The data is loaded in accordance with the relational schema (22). (Appellants' specification, page 18, lines 1-5; and page 58, line 27 through page 59, line 7).

VI. Grounds of Rejection to be Reviewed on Appeal

In the final Office Action, the following rejections were made:

(A) Claims 1-10, 12-17, 30-47, and 61-74 were rejected under 35 U.S.C. §103(a) as being obvious over U.S. Patent No. 6,519,597 to Cheng et al. (hereinafter "Cheng") in view of U.S. Patent No. 6,480,865 to Lee et al. (hereinafter "Lee").

(B) Dependent claims 11, 18-29, and 48-60 were rejected under 35 U.S.C. §103(a) as being obvious over Cheng in view of Lee and further in view of U.S. Patent No. 6,418,448 to Sarkar (hereinafter "Sarkar").

As claim 70 has been cancelled, the rejection of claim 70 is moot. Accordingly, the issues presented in this appeal are:

(1) Whether claims 1-10, 12-17, 30-47, 61-69, and 71-74 are patentable over the combination of Cheng and Lee.

(2) Whether dependent claims 11, 18-29, and 48-60 are patentable over the combination of Cheng, Lee, and Sarkar.

VII. Argument

Issue 1: §103(a) Rejection of Claims 1-10, 12-17, 30-47, 61-69, and 71-74

A. Independent Claims 1 and 37

The Examiner rejected independent claims 1 and 37 under 35 U.S.C. §103(a) as being obvious over Cheng in view of Lee (pages 4 and 9 of the final Office Action). A *prima facie* case of obviousness requires: (1) a suggestion or motivation to modify or combine the reference teachings; (2) a reasonable expectation of success; and (3) a teaching or suggestion in the prior art references of all of the claim limitations (MPEP 2143). The Office Action does not satisfy all of these requirements.

1. Failure of Cheng and Lee to teach or suggest every claim limitation

"To establish prima facie obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art. *In re Royka*, 490 F.2d 981, 180 USPQ 580 (CCPA 1974)." M.P.E.P. § 2143.03. Cheng and Lee, taken either alone or in combination, do not teach or disclose every claim limitation recited in independent claims 1 and 37. For example, each of the independent claims 1 and 37 recites the claim limitation of "...automatically generating the schema for the relational database from the metadata...." This claim limitation is not taught or suggested by Cheng, Lee, or the combination of Cheng and Lee for at least the following reasons.

With respect to Cheng, there is no teaching or suggestion of automatically generating the schema for the relational database. Appellants agree with the admission made on page 5 of the Office Action that "Chang [sic] does not explicitly teach automatically generating the schemas for the relational database." In fact, Cheng teaches away from and precludes

automatic generation of relational schema. Cheng is directed to a relational database extender for storing, querying, and retrieving structured documents such as XML documents (Abstract of Cheng). The extender may be used to create structured indexes for indexing structured documents within a relational database (Abstract of Cheng). However, affirmative manual user intervention is required to create the index structure. Cheng contains numerous teachings of user intervention being required to create the structured indexes, or to perform other manual operations to map XML documents to a relational database (e.g., see col. 8, lines 13-15; col. 11, lines 62-63; col. 24, line 37; col. 25, line 1; and col. 26, line 4 of Cheng). To illustrate, each respective preamble of independent claims 1 and 13 of Cheng recites, "...said extender enabling a user to create said at least one index in said database system..." (col. 24, lines 36-38 and col. 26, lines 4-5 of Cheng, emphasis added). The preamble of independent claim 7 of Cheng recites similar language (col. 25, lines 1-2 of Cheng). Cheng further teaches, "the index being created based on characteristics input by the user" (col. 8, lines 11-13 of Cheng, emphasis added). In addition, each rectangular block (i.e., steps S1, S3, S4, S6, S8, S10, S11, and S12) of Figure 4 of Cheng represents actions performed by the user (col. 8, lines 2-3 of Cheng). Thus, the system of Cheng relies upon user input and is precluded from performing the claim limitation of automatically generating schema for a relational database.

The description of the prior art in the Background of the Invention section of Appellants' specification accurately describes the user-performed manual indexing taught in Cheng:

> [0020] Prior attempts to solve these problems have fallen short of an efficient and, preferably automatic, way to import XML data into a relational database schema. Current industry enterprise database management system (DBMS) vendors, such as DB2 and Oracle 8i, provide XML extensions for bringing XML data into a relational database. However, these methods are far from

> automatic. These vendors require users to manually design the relational schema for a given DTD and to define the mapping between the DTD and the user-designed schema for the loading of XML documents.

(Page 5, lines 16-22 of Appellants' Specification, emphasis added.) Cheng teaches exactly what Appellants' Background of the Invention describes: a DB2 XML extender (100) that requires users to manually define structural mapping indexes. In contrast to the manual definition of structural indexes taught in Cheng, the claimed invention is able to automatically generate schema for a relational database out of an XML DTD (paragraph 0030 of Appellants' Specification).

Moreover, claim limitations reciting automatic steps have been treated as being inherently different from steps that require manual user input. For example, in *MercExchange v. eBay*, 2005 U.S. App. LEXIS 430 (Fed. Cir. 2005), the Federal Circuit refused to expand a manually performed claim limitation to include an automated capability. Similarly, the manual defining of structural indexes taught in Cheng cannot be interpreted as being performed automatically. Accordingly, Cheng does not teach or suggest the claim limitation of automatically generating schema for a relational database.

Lee also fails to teach or suggest every claim limitation recited in independent claims 1 and 37. For example, Lee does not teach or suggest the claim limitation of automatically generating schema for a relational database from metadata. Lee is directed to a method for annotating XML documents with dynamic functionality (Abstract of Lee). An annotation is in the form of an element of an XML document having a "dxmlj" prefix tag (col. 5, lines 1-3 of Lee). A processor recognizes the "dxmlj" tags and processes those tags using Java classes and objects to transform the XML document (col. 5, lines 1-8 of Lee). However, the transformations of XML documents taught in Lee have nothing to do with generating schema for a relational database. Rather, Lee teaches that the contents of XML documents are

transformed in-place (col. 3, lines 45-54 of Lee), with the output of the method of Lee being merely an XML document having internally transformed data (col. 6, line 64 to col. 7, line 13 and col. 11, lines 1-2 of Lee). Even if the DTD of an XML document is transformed along with the XML document, there is no teaching whatsoever in Lee that the transformed XML document or DTD includes schema generated for a relational database.

To further illustrate, Lee provides an example of internally transforming data within an XML document. An "apply element" prefix tag within an XML document is recognized by a processor (col. 6, lines 16-22 of Lee). The prefix tag specifies a Java function object, which is applied to an identified tree or sub-tree within the XML document (col. 6, lines 16-22 and lines 41-42 of Lee). Lee specifically teaches an example of a "DollarsToPounds" Java class being identified by an element prefix tag (col. 6, line 64 through col. 7, line 13 of Lee). The "DollarsToPounds" Java class provides a function that is executed to convert salary data within an XML document from dollars to pounds (col. 6, line 64 through col. 7, line 13 of Lee). The simple transformation of data within an XML document has nothing to do with automatically generating schema for a relational database from metadata. There is no teaching or suggestion in Lee of the transformed XML document having undergone any transformation that would prepare it for mapping to a relational database. In fact, Lee does not even mention a relational database.

Although the Examiner asserts on page 3 of the Office Action that Lee teaches "automatically generate [sic] and transform with [sic] the transformed XML document including the schema for a DBs2, a relational database (col. 3, lines 40-54)," Appellants cannot find any support for this assertion in Lee and respectfully disagree with this interpretation of Lee. Lee does not even mention the terms "relational database," "DBs2," or "DB2." As discussed above, the transformations taught in Lee have nothing to do with

schema for relational databases. Even if Lee teaches automatic updating of data within XML documents, there simply is no teaching or suggestion of a transformation or creating of schema for a relational database. Thus, Lee fails to teach or suggest the claim limitation of automatically generating schema for a relational database from metadata.

The combination of Cheng and Lee also fails to teach or suggest every limitation recited in independent claims 1 and 37. As mentioned above, the Examiner admits that Cheng does not teach automatically generating the schema for the relational database from metadata (page 5 of the Office Action). In an attempt to cure this deficiency of Cheng, the Examiner suggests combining the teachings of Lee with the teachings of Cheng "by incorporating the use of the XML document that specify [sic] the schema with the XML extender of DB2..." (page 6 of the Office Action). To support this asserted combination, the Examiner alleges that "Lee teaches XML document as well as XML schema are automatically generated and transformed..." (page 5 of the Office Action). However, as discussed above, any automatic transformations of XML documents and schema taught in Lee have nothing to do with the generation of schema for relational databases.

There is no teaching or suggestion in Lee of the transformed XML documents containing schema that would be useful for mapping the XML documents to a relational database. Based on the teachings of Lee and Cheng, if any transformed XML document of Lee is inserted into the system of Cheng, manual user intervention is still required to create the structure index for mapping the transformed XML document to a relational database because the automatic transformations taught in Lee do not generate schema useful for mapping XML document data to a relational database. The combination of a completely unrelated automatic process (e.g., the transformation of data in an XML document) does not remove the need for manual user intervention required by Cheng to map XML documents to

schema for a relational database. Therefore, the combination of Cheng and Lee fails to teach or suggest the claim limitation of automatically generating schema for a relational database from metadata, and the Office Action does not establish a *prima facie* case of obviousness against independent claims 1 and 37.

Sarkar was cited to disclose an entity relationship diagram relating to XML/RDF and, as such, does nothing to cure the deficiencies of Cheng and Lee with respect to independent claims 1 and 37 (page 15 of the Office Action). Accordingly, the rejection of these claims should not be sustained.

2. Cheng and Lee not combinable to one skilled in the art

Even if the combined teachings of Cheng and Lee were somehow interpreted to disclose every limitation recited in independent claims 1 and 37, the Office Action fails to establish a *prima facie* case of obviousness against these claims for a separate and independent reason: the combination asserted by the Examiner would not have been obvious to one of ordinary skill in the art at the time of invention. "Obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988); *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed Cir. 1992)." M.P.E.P. § 2143.01. "The mere fact that references can be combined or modified does not render the resultant combination obvious unless the prior art also suggests the desirability of the combination. In re Mills, 916 F.2d 680, 16 USPQ2d 1420 (Fed. Cir. 1990)." M.P.E.P. § 2143.01.

On page 5 of the Office Action, the Examiner asserts that it would have been obvious to a person of ordinary skill in the art "to combine the teachings of Cheng with the teachings

of Lee by incorporating the use of the XML document that specify [sic] the schema with the XML extender of DB2" (page 5 of the Office Action). Page 6 of the Office Action recites the Examiner's asserted motivation for the combination of Cheng and Lee:

> The motivation being to have made the schema generation method for generating a schema relational database from metadata of XML and it would provide an application for storing XML documents in existent or newly created columns of a relational database table in the storing XML in the relational database environment.

Page 2 of the Advisory Action indicates further motivation as being "to have a system for automatically loading XML document [sic] into a relational database schema basded [sic] on the metadata." However, one of ordinary skill in the art reading either reference (Cheng or Lee) and noting deficiencies therein would not have been motivated to seek information to overcome such deficiencies from the other reference because of its irrelevance. Cheng is directed to a relational database extender designed to store, query, and retrieve structured documents (Abstract of Cheng). In contrast, Lee relates to automatic transformations of XML document data, which transformations have nothing to do with relational databases. In particular, one of ordinary skill in the art would not be motivated to combine the completely unrelated automatic processes of Lee with the teachings of Cheng, especially when the combination fails to eliminate the need for the manual user intervention required by Cheng.

Moreover, Lee teaches away from combination with Cheng. A reference must be considered for all it teaches, including disclosures that teach away from the invention as well as disclosures that point toward the invention. *Ashland Oil, Inc. v. Delta Resins & Refractories, Inc.* 776 F.2d 281, 227 U.S.P.Q. 657 (Fed. Cir. 1985). In contrast to the teachings of Cheng directed to relational databases, Lee is directed to adding dynamism to XML documents by internally transforming data (e.g., a sub-tree) within an XML document (Abstract and col. 6, lines 15-22 of Lee). In other words, the output of the method taught by

Lee is simply an XML document with transformed internal data (col. 11, lines 1-2 of Lee). There is no teaching of the transformed XML document including schema for a relational database, so the transformed XML document must undergo the entire process taught in Cheng to be mapped to a relational database, including the manual user definition of structured indexes. As is clear from the above discussion, Cheng and Lee are directed to solving different and unrelated problems, and their combination does not help to solve either of the unrelated problems. To combine Cheng and Lee as suggested by the Examiner would be an impermissible use of hindsight reconstruction from Appellants' disclosure. *In re Dembiczak*, 50 USPQ2d 1614 (Fed. Cir. 1999). Therefore, the Office Action does not establish a *prima facie* case of obviousness (MPEP 2143) against independent claims 1 and 37, and the rejection of independent claims 1 and 37 should not be sustained.

B. Independent Claim 67 and Dependent Claim 8

Independent claim 67 also recites the claim limitation of "...automatically generating the schema for the relational database from the metadata...." In rejecting independent claim 67, the Examiner relies upon the same asserted combination of Cheng and Lee that was discussed above in relation to independent claims 1 and 37 (pages 11-13 of the Office Action and page 2 of the Advisory Action). Dependent claim 8 depends from independent claim 1 (by way of claims 2-7). Therefore, for the same reasons discussed above, the rejection of independent claim 67 and dependent claim 8 should not be sustained.

Independent claim 67 and dependent claim 8 also include additional claim limitations that are independently patentable over the prior art of record. For example, among other limitations, claim 67 recites:

> ...an extractor adapted to read automatically a document-type definition that extracts metadata representative of the document-type definition from the

> document-type definition, wherein the extractor stores the metadata in at least three tables comprising a metadata item table containing metadata representative of element types in the document-type definition, a metadata attribute table containing metadata representative of attributes in the document type definition, and a metadata nesting table containing metadata representative of nesting relationships between particles in the document type definition.... (Emphasis added.)

Cheng and Lee, taken either alone or in combination, do not teach or suggest the claim limitation of an extractor storing metadata in at least three tables comprising a metadata item table, a metadata attribute table, and a metadata nesting table as recited in independent claim 67. On page 12 of the Office Action, the Examiner relies upon Cheng to reject this claim limitation. However, Cheng does not teach three distinct tables comprising a metadata item table, metadata attribute table, and a metadata nesting table. In direct contrast, Cheng teaches a single DTD reference table (XML_DTD_REF) that "stores all of the information about the DTDs that can be used by XML documents" (col. 11, lines 57-60 of Cheng, emphasis added). Cheng further teaches that with the DTD reference table, "no duplication information needs to be stored in normal tables with XML columns" (col. 11, lines 65-67 of Cheng). Accordingly, Cheng does not teach or suggest storing DTD metadata in three distinct tables.

By virtue of its dependence from claim 2 (by way of claims 3-7) and from claim 5 (by way of claims 6 and 7), claim 8 also recites the use of at least three tables, namely a metadata item table, a metadata attribute table, and a metadata nesting table. Thus, the rejection of dependent claim 8 is also improper. In rejecting the metadata item table recited in claim 2, the Examiner relies upon the DTD reference table taught in Cheng (page 6 of the Office Action, citing col. 11, lines 60-65 of Cheng). In rejecting the metadata attribute table recited in claim 5, the Examiner again relies upon the DTD reference table taught in Cheng (page 6 of the Office Action, citing col. 8, lines 57-67 of Cheng). From the rejections of claims 2 and 5, it is clear that the Examiner relies upon a single table taught in Cheng to reject both the

metadata item table and the metadata attribute table, which are two of the at least three tables recited in independent claim 67 and dependent claim 8. A single table cannot reasonably be relied upon to reject two of the three distinct tables recited in independent claim 67 or in dependent claim 8.

Moreover, the rejection of the metadata nesting table recited in claim 8 does not even mention a table. To reject claim 8, the Examiner relies upon SQL query statements defining containment relationships (page 7 of the Office Action, citing col. 14, lines 36-42 of Cheng.). SQL query statements do not teach or suggest a metadata nesting table.

Moreover, none of the tables (e.g., the DTD reference table, internal registration table, or XML column tables) disclosed in Cheng is specifically purposed for metadata items, metadata attributes, or metadata nesting relationships. Any storage of an entire XML document or DTD into a table (e.g., the DTD reference table or internal registration table of Cheng) fails to store different types of metadata into separate tables. Thus, Cheng does not teach or suggest the claim limitation of storing the metadata in at least three tables comprising a metadata item table, a metadata attribute table, and a metadata nesting table, as required by claims 8 and 67.

Lee was cited to disclose automatic transformation and reading of XML documents and DTDs and, as such, does nothing to cure the deficiencies of Cheng with respect to the claim limitation of storing the metadata in at least three tables comprising the recited combination of a metadata item table, a metadata attribute table, or a metadata nesting table. Based on the foregoing reasons, the Office Action does not establish a *prima facie* case of obviousness against independent claim 67 or dependent claim 8, and the rejection of these claims should not be sustained.

C. **Dependent Claims 2, 4, 6-7, 9, 10, 12-17, 30-36, 38, 40, 41, 43-47, 61-66, 68, 69, and 71-74**

Dependent claims 2, 4, 6-7, 9, 10, 12-17, 30-36, 38, 40, 41, 43-47, 61-66, 68, 69, and 71-74 depend from independent claims 1, 37, and 67. Therefore, for the same reasons discussed above in relation to the independent claims, the rejection of these claims should not be sustained.

D. **Dependent Claim 5**

The rejection of claim 5 should not be sustained because this claim depends from independent claim 1 (by way of claims 2-4). Claim 5 also recites subject matter that is independently patentable over the prior art of record. By virtue of its dependence from claim 2 (by way of claims 3 and 4), dependent claim 5 recites the use of at least two tables, namely, an item metadata table and an attribute metadata table. As discussed above, the Examiner relies upon a single table (the DTD reference table of Cheng) to reject both claims 2 and 5. Cheng does not teach or suggest the use of two tables comprising a metadata item table and a metadata attribute table. Moreover, the DTD reference table disclosed in Cheng is not specifically purposed for metadata items or metadata attributes. As discussed above, Lee does nothing to cure the deficiencies of Cheng with respect to the claim limitation of generating at least two tables comprising the recited combination of a metadata item table and a metadata attribute table, as required by claim 5. Thus, the rejection of dependent claim 5 should not be sustained.

E. **Dependent Claims 3 and 39**

The rejection of claims 3 and 39 should not be sustained because these claims depend from independent claims 1 and 37, respectively. Claims 3 and 39 are also independently patentable over the prior art of record. In particular, claim 3 recites the claim limitation of "creating at least one default item in the item metadata table."

Similarly, claim 39 recites the claim limitation of an extractor that creates at least one default item in the item metadata table. The Examiner relies on column 12, lines 35-38 of Cheng to reject the claim limitation of creating at least one default item in the item metadata table (pages 5 and 8 of the Office Action). However, this section of Cheng does not even mention the word "default." In fact, the only mention of the word "default" in Cheng is limited to a default transformation function for use in retrieving an XML document (col. 20, lines 7-15 of Cheng). Cheng's default function is different from and in no way teaches or suggests the claimed default item because using a default function when retrieving an XML document is completely unrelated to creating a default item in the item metadata table. The default item taken in the context of claim 3 is entirely distinct from a default function as taught in Cheng.

Lee also fails to disclose the claim limitation of creating at least one default item in the item metadata table. Lee's only mention of the word "default" is limited to setting a prefix type default at the top of each sub-tree within an XML document. This disclosure has nothing to do with creating a default item in the item metadata table because a sub-tree prefix within an XML document is clearly different from an item in the metadata table, especially when the default item is considered in the entire context of claim 3. Because neither Lee nor Cheng teaches or suggests the claim limitation of creating a default item in the item metadata table, the rejection of claims 3 and 39 should not be sustained.

F. Dependent Claim 42

The rejection of claim 42 should not be sustained because this claim depends from independent claim 37 (by way of claims 38-41). Claim 42 is also independently patentable over the prior art of record for another reason. On page 8 of the Office

Action, the Examiner rejected claim 42 based on the assertion that claim 42 is essentially the same as claim 6 but directed to a system rather than a method. Appellants respectfully disagree with the Examiner's assertion that claim 42 is essentially the same as claim 6. Claim 6 includes the limitation of creating a default attribute value in the attribute metadata table, while claim 42 recites an extractor that "generates a row in the attribute metadata table corresponding to each of the attribute type content particles of the document-type definition." Clearly, claim 42 includes limitations that cannot be rejected for the same reason used to reject claim 6. For example, the claim limitation of generating a row is not recited in claim 6. Therefore, the Examiner has failed to establish a *prima facie* case of obviousness against claim 42 (MPEP 2143), and the rejection of claim 42 should not be sustained.

Issue 2: §103(a) Rejection of Dependent Claims 11, 18-29, and 48-60

The Examiner rejected dependent claims 11, 18-29, and 48-60 under 35 U.S.C. §103(a) as being obvious over Cheng in view of Lee and Sarkar (page 15 of the final Office Action). As previously mentioned, Sarkar was cited to disclose an entity relationship diagram relating to XML/RDF and, as such, does nothing to cure the deficiencies of Cheng and Lee with respect to independent claims 1 and 37 (page 15 of the Office Action). Because claims 11, 18-29, and 48-60 depend from independent claims 1 and 37, the rejection of claims 11, 18-29, and 48-60 should not be sustained.

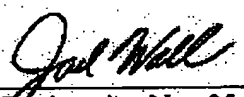
VIII. Conclusion

In view of the foregoing, it is submitted that the final rejections of the pending claims are improper and should not be sustained. Therefore, a reversal of the final rejections of October 22, 2004 is respectfully requested.

It is believed that a fee of $500.00 is due with this Appeal Brief. Please charge our Deposit Account No. 07-2347, under Order No. 00-8013, from which the undersigned is authorized to draw, for any fee due with this Appeal Brief. To the extent necessary, a petition for extension of time under 37 C.F.R. § 1.136 is hereby made, the fee for which should be charged to the above account.

Dated: April 25, 2005

Respectfully submitted,

By 

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IX. Claims Appendix

1. (Previously Presented) A method for generating a schema for a relational database corresponding to a document having a document-type definition and data complying with the document-type definition, the document-type definition having content particles representative of the structure of the document data, as well as loading the data into the relational database in a manner consistent with the relational schema, the method comprising the steps of:

extracting metadata representative of the document-type definition from the document-type definition;

automatically generating the schema for the relational database from the metadata, wherein at least one table is thereby defined in the relational database corresponding to at least one content particle of the document-type definition via the metadata; and

loading the document data into the at least one table of the relational database according to the relational schema in a manner driven by the metadata.

2. (Previously Presented) The method of claim 1 wherein the extracting step further comprises the step of generating an item metadata table corresponding to element type content particles in the document-type definition.

3. (Previously Presented) The method of claim 2 wherein the extracting step further comprises the step of creating at least one default item in the item metadata table.

4. (Previously Presented) The method of claim 3 wherein the extracting step further comprises the step of updating the item metadata table with each of the element type content particles of the document-type definition.

5. (Previously Presented) The method of claim 4 wherein the extracting step further comprises the step of generating an attribute metadata table corresponding to attribute type content particles in the document-type definition.

6. (Previously Presented) The method of claim 5 wherein the extracting step further comprises the step of creating a default attribute value in the attribute metadata table corresponding to attributes of element types in the document-type definition.

7. (Previously Presented) The method of claim 6 wherein the extracting step further comprises the step of updating the attribute metadata table with each of the attribute type content particles of each element type of the document-type definition.

8. (Previously Presented) The method of claim 7 wherein the extracting step further comprises the step of generating a nesting metadata table for storing data items corresponding to nesting relationships implied in the document-type definition.

9. (Previously Presented) The method of claim 8 wherein the extracting step further comprises the step of generating a row in the nesting metadata table corresponding to each relationship between items identified in the item metadata table.

10. (Previously Presented) The method of claim 9 wherein the generated nesting table row indicates the cardinality between a pair of items.

11. (Original) The method of claim 10 wherein the cardinality is one of one-to-one and one-to-many.

12. (Previously Presented) The method of claim 8 wherein the generated nesting table row indicates a relationship between a parent item and a child item.

13. (Previously Presented) The method of claim 8 wherein the generated nesting table row indicates a relative position of a child item with respect to other items in a definition of the corresponding parent item.

14. (Previously Presented) The method of claim 7 wherein the generating step further comprises the step of creating at least one table in the schema of the relational database corresponding to at least one row of the metadata item table.

15. (Previously Presented) The method of claim 14 wherein the generating step further comprises generating at least one default field in the table of the schema.

16. (Previously Presented) The method of claim 15 wherein the generating step further comprises the step of altering the schema of the relational database to add at least one column to the at least one table in the relational database schema corresponding to each row of the metadata attribute table.

17. (Previously Presented) The method of claim 16 wherein the generating step further comprises the step of altering the tables in the schema of the relational database to add columns representing links between tables of the relational database schema corresponding to each relationship identified in each row of the metadata nesting table.

18. (Previously Presented) The method of claim 17 wherein the generating step further comprises the step of altering the tables in the schema of the relational database by adding a foreign key to a parent table if the identified relationship is a one-to-one relationship.

19. (Previously Presented) The method of claim 18 wherein the generating step further comprises the step of altering the tables in the schema of the relational database by adding a foreign key to a child table if the identified relationship is a one-to-many relationship.

20. (Previously Presented) The method of claim 19 and further comprising the step of initializing a link table.

21. (Previously Presented) The method of claim 19 and further comprising the step of determining whether each item in the metadata nesting table contains a group type.

22. (Previously Presented) The method of claim 19 and further comprising the step of initializing a pattern-mapping table.

23. (Previously Presented) The method of claim 22 and further comprising the step of directly mapping a link into the link table for each item in the metadata nesting table that does not contain a group type.

24. (Previously Presented) The method of claim 23 and further comprising the step of creating an additional link table containing a mapping of a link pattern for each group type identified in the metadata item table.

25. (Previously Presented) The method of claim 24 and further comprising the step of creating a create tuple loading action in the pattern mapping table associated with a particular pattern corresponding to each item in the item metadata table.

26. (Previously Presented) The method of claim 25 wherein the loading step further comprises the step of creating an update tuple loading action in the pattern mapping table associated with a particular pattern corresponding to each attribute in the attribute metadata table.

27. (Previously Presented) The method of claim 26 wherein the loading step further comprises the steps of:

creating a create tuple loading action in the pattern mapping table associated with a particular pattern corresponding to each group in a link; and

creating an assign action tuple loading action in the pattern mapping table associated with a particular pattern corresponding to each pair in the same link;

corresponding to each link in the link pattern table.

28. (Previously Presented) The method of claim 27 wherein the loading step further comprises the step of forming a tree structure with the document data.

29. (Previously Presented) The method of claim 28 wherein the loading step further comprises the step of traversing the formed tree and updating the at least one relational database table according to the rows of the pattern mapping table.

30. (Previously Presented) The method of claim 1 and further comprising the step of optimizing the metadata.

31. ((Previously Presented) The method of claim 30 wherein the optimizing step further comprises the step of eliminating duplicate particle references in the metadata.

32. (Previously Presented) The method of claim 31 wherein the optimizing step further comprises the step of simplifying references to corresponding elements, links and attributes in the metadata.

33. (Previously Presented) The method of claim 32 wherein the optimizing step further comprises the step of inlining particular attributes of the metadata.

34. (Previously Presented) The method of claim 1 wherein the document is an XML document.

35. (Previously Presented) The method of claim 1 wherein the document-type definition is a DTD.

36. (Previously Presented) The method of claim 1 wherein the data is tagged data.

37. (Previously Presented) A system for generating a schema for a relational database corresponding to a document having a document-type definition and data complying with the document-type definition, the document-type definition having content particles representative of the structure of the document data, as well as loading the data into the relational database in a manner consistent with the relational schema, the system comprising:

an extractor adapted to read a document-type definition that extracts metadata representative of the document-type definition from the document-type definition;

a generator operably interconnected to the extractor for automatically generating the schema for the relational database from the metadata, wherein at least one table is thereby defined in the relational database corresponding to at least one content particle of the document-type definition via the metadata; and

a loader operably interconnected to the generator for loading the document data into the at least one table of the relational database according to the relational schema in a manner driven by the metadata.

38. (Previously Presented) The system of claim 37 wherein the extractor generates an item metadata table for storing data items corresponding to element type content particles in the document-type definition.

39. (Previously Presented) The system of claim 38 wherein the extractor creates at least one default item in the item metadata table.

40. (Previously Presented) The system of claim 39 wherein the extractor generates a row in the item metadata table corresponding to each of the element type content particles of the document-type definition.

41. (Previously Presented) The system of claim 40 wherein the extractor generates an attribute metadata table corresponding to attribute type content particles in the document-type definition.

42. (Previously Presented) The system of claim 41 wherein the extractor generates a row in the attribute metadata table corresponding to each of the attribute type content particles of the document-type definition.

43. (Previously Presented) The system of claim 42 wherein the extractor generates a nesting metadata table for storing data items corresponding to nesting relationship implied in the document-type definition.

44. (Previously Presented) The system of claim 43 wherein the extractor generates a row in the nesting metadata table corresponding to each relationship identified in the document-type definition between items identified in the item metadata table.

45. (Previously Presented) The system of claim 44 wherein the generator creates at

least one table in the relational database schema of the relational database corresponding to data in the metadata item table.

46. (Previously Presented) The system of claim 45 wherein the generator alters the schema of the relational database to add a columns to the at least one table of the relational database schema corresponding to each row of the metadata attribute table.

47. (Previously Presented) The system of claim 46 wherein the generator alters the tables in the schema of the relational database to add columns representing links between tables of the relational database schema corresponding to each relationship identified in each row of the metadata nesting table.

48. (Previously Presented) The system of claim 47 wherein the generator alters the tables in the schema of the relational database by adding a foreign key to a parent table if a relationship identified between a pair of tables is a one-to-one relationship.

49. (Previously Presented) The system of claim 48 wherein the generator alters the tables in the schema of the relational database by adding a foreign key to a child table if a relationship identified between a pair of tables is a one-to-many relationship.

50. (Previously Presented) The system of claim 37 and further comprising a link table.

51. (Previously Presented) The system of claim 50 wherein the system determines whether each item in the metadata nesting table contains a group type content particle.

52. (Previously Presented) The system of claim 51 and further comprising a pattern-mapping table in an initialized state.

53. (Previously Presented) The system of claim 52 wherein the system directly forms a link in the link table for each item in the metadata nesting table that does not contain a group type.

54. (Previously Presented) The system of claim 53 wherein the loader creates an additional link table containing a mapping of a link pattern for each group type identified in the metadata item table.

55. (Previously Presented) The system of claim 54 wherein the system retrieves a preselected set of rows corresponding to each item in the metadata item table.

56. (Previously Presented) The system of claim 55 wherein the system creates a create tuple loading action in the pattern mapping table associated with a particular pattern corresponding to each item in the item metadata table.

57. (Previously Presented) The system of claim 56 wherein the system creates an update tuple loading action in the pattern mapping table associated with a particular pattern corresponding to each attribute in the attribute metadata table.

58. (Previously Presented) The system of claim 57 wherein the system:
creates a create tuple loading action in the pattern mapping table associated with a particular pattern corresponding to each group in a link; and
creates an assign action tuple loading action in the pattern mapping table associated with a particular pattern corresponding to each pair in the same link;
wherein each created action corresponds to each link in the link pattern table.

59. (Previously Presented) The system of claim 58 wherein the loader forms a tree structure with the document data.

60. (Previously Presented) The system of claim 59 wherein the loader traverses the formed tree structure and updates the at least one relational database table according to the rows of the pattern mapping table.

61. (Previously Presented) The system of claim 37 and further comprising an optimizer for refining the metadata.

62. (Previously Presented) The system of claim 61 wherein the optimizer eliminates duplicate particle references in the metadata.

63. (Previously Presented) The system of claim 62 wherein the optimizer simplifies references to corresponding elements, links and attributes in the metadata.

64. (Previously Presented) The system of claim 37 wherein the document is an XML document.

65. (Previously Presented) The system of claim 37 wherein the document-type definition is a DTD.

66. (Previously Presented) The system of claim 37 wherein the data is tagged data.

67. (Previously Presented) A system for generating a schema for a relational database corresponding to a document having a document-type definition and data complying with the document-type definition, the document-type definition having content particles representative of the structure of the document data, as well as loading the data into the relational database in a manner consistent with the relational schema, the system comprising:

an extractor adapted to read automatically a document-type definition that extracts metadata representative of the document-type definition from the document-type definition, wherein the extractor stores the metadata in at least three tables comprising a metadata item table containing metadata representative of element types in the document-type definition, a metadata attribute table containing metadata representative of attributes in the document type definition, and a metadata nesting table containing metadata representative of nesting relationships between particles in the document type definition; and

a generator operably interconnected to the extractor for automatically generating the schema for the relational database from the metadata, wherein at least one table is thereby defined in the relational database corresponding to at least one content particle of the document-type definition via the metadata.

68. (Previously Presented) The system of claim 67 and further comprising a pattern-mapping table initially constructed in an initialized state.

69. (Previously Presented) The system of claim 68 wherein the pattern mapping table is loaded with actions indicative of relationships between the data and the document-type definition.

70. (Canceled)

71. (Previously Presented) The system of claim 67 wherein the generator forms a table with at least one default field in the relational database for each item contained in the metadata item table.

72. (Previously Presented) system of claim 71 wherein the generator forms a column in a corresponding table in the relational schema corresponding to each attribute in the metadata attribute table linked to an item in the metadata item table.

73. (Previously Presented) The system of claim 72 wherein the generator forms a link between tables in the relational database corresponding to nesting relationships contained in the metadata nesting table.

74. (Previously Presented) The system of claim 67 and further comprising a loader operably interconnected to the generator for loading the document data into the at least one table of the relational database according to the relational schema and driven by the metadata.